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AUTHOR Hymel, Glenn M.; Mathews, Gary S.
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ABSTRACT

A study was undertaken to evaluate how a mastery approach to teaching history on the high school level influenced student achievement and attitudes. Mastery learning is interpreted to include assumptions regarding student learning capability as well as specified curricular/instructional/evaluative procedures. Essential to mastery learning strategy are feedback corrective procedures such as diagnostic tests. Participants in the study included 69 high school students assigned to three sections of United States history. The sections were based respectively on highly specific formative tests plus learning correctives, relatively general formative tests and learning correctives, and relatively general formative tests with no learning correctives. An objective test measured student cognitive mastery of unit material and a questionnaire measured student attitudes toward the unit. Tests and questionnaires were statistically analyzed. Findings indicated that there was a significant difference among the three treatment groups and that the group exposed to highly specific formative tests and learning corrections outperformed the other two treatment groups. The conclusion is that a combined feedback-corrective strategy in social studies instruction can improve student achievement and result in more favorable unit evaluations. (DB)

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A MASTERY APPROACH TO TEACHING U. S. HISTORY: THE IMPACT ON COGNITIVE ACHIEVEMENT AND UNIT EVALUATION

Glenn M. Hymel
Loyola University, New Orleans

Gary S. Mathews
New Orleans Public Schools

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at the Annual Meeting of the
American Educational Research Association

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Abstract

In response to the limited amount of mastery learning research available in the social studies area of the curriculum (Rice, 1976), this study focused on a two-week unit on World War II which was taught to 69 high school students via a group-based, teacher-paced approach. It was hypothesized that the presence of a combined feedback-corrective strategy as well as an increased level of specificity of feedback-corrective procedures would result in (a) significantly higher achievement scores on an end-of-unit summative test and (b) significantly more favorable unit evaluations by students. A quasi-experimental, three-group, posttest-only design involving three instructional treatments was used. The data were analyzed via ANOVA and the Scheffé method of multiple comparisons. The findings support the general hypothesis and several specific hypotheses of the study and, therefore, contribute to an accumulating body of evidence (Block & Tierney, 1974; Crotty, 1975; Jones, 1974; Ware, 1977, Wyckoff, 1974; Jones, Gordon, & Schechtman, Note 1) which suggests that the effective use of a combined feedback-corrective strategy involving a manageable degree of specificity is possible within the social studies area and is not limited to only those parts of the curriculum characterized by greater structure and hierarchically-arranged content.

A Mastery Approach To Teaching U. S. History: The Impact on Cognitive Achievement and Unit Evaluation

The mastery approach to instruction is both a set of assumptions regarding the capability of students to learn and a set of curricular/instructional/evaluative procedures addressed by teachers so as to maximize the quality of instruction delivered to students. In the former, it is assumed that if the quality of instruction is optimal for students, then it should be possible for the majority of students in a course to learn (master) the essential competencies comprising the course (Bloom, 1968). In the latter, the mastery strategy calls for the use of the following: relatively small, manageable units of instruction that are sequentially arranged; the specification of performance objectives and expected levels of proficiency; criterion-referenced formative and summative tests; and learning correctives (Block & Anderson, 1975). The essence of the mastery learning strategy for the improvement of instruction is based upon the feedback-corrective procedures as contained in the use of formative tests for diagnostic purposes and the prescription of learning correctives for remedying student deficiencies.

This study was supported in part by a Loyola University Faculty Research Grant and was conducted in conjunction with the research/evaluation function of the Loyola Center for Educational Improvement.

The effectiveness of the mastery learning strategy in enhancing cognitive achievement, retention, transfer, and affective reactions is well documented in the research literature (Block & Burns, 1976; Bloom, 1976). This has been particularly the case in those areas of the curriculum which are characterized by their very nature as being highly structured and hierarchically sequenced, such as mathematics and the basic sciences. Although mastery learning research in social studies has indeed been in progress since the resurgence of interest in the topic in 1968--some supportive of the efficacy of mastery learning (Block & Tierney, 1974; Crotty, 1975; Jones, 1974; Ware, 1977; Wyckoff, 1974; Jones, Gordon, & Schechtman, Note 1) and others inconclusive (Beausang, 1976; Contreras, 1975; Fagan, 1975; Gaines, 1971; Ludwig, 1976; Myers, 1975; Rubovits, 1975)--there still exists somewhat of a paucity of mastery learning research in this area of the curriculum (Rice, 1976).

This mastery learning study, therefore, focused on a two-week unit on World War II taught at the high school level via a group-based, teacher-paced approach. It examined the impact of varying degrees of specificity of formative tests and learning correctives on (a) the cognitive achievement of students completing the unit on World War II and (b) the students' evaluation of the unit. In general, it was hypothesized that the presence of a combined feedback-corrective (diagnostic-prescriptive) strategy as well as an increased level of specificity of feedback-corrective procedures would result in (a) significantly higher posttest achievement scores and (b) significantly more favorable unit evaluations. More specifically, the following research hypotheses were formulated:

1. There will be a significant difference, relative to achievement on an end-of-unit summative test and students' evaluation of the unit, between two treatment groups using varying degrees of specificity of feedback-corrective procedures. The group using highly specific feedback-corrective procedures will score significantly higher on a summative test and record significantly more favorable unit evaluations than will the group using relatively general feedback-corrective procedures.

2. There will be a significant difference, relative to achievement on an end-of-unit summative test and students' evaluation of the unit, between one treatment group using highly specific feedback-corrective procedures and a second treatment group using relatively general formative tests but no learning correctives. The former group will score significantly higher on a summative test and record significantly more favorable unit evaluations than will the latter group.

3. There will be a significant difference, relative to achievement on an end-of-unit summative test and students' evaluation of the unit, between one treatment group using relatively general feedback-corrective procedures and a second treatment group using relatively general formative tests but no learning correctives. The former group will score significantly higher on a summative test and record significantly more favorable unit evaluations than will the latter group.

Method

Subjects

The participants in the study included 69 secondary school students who had been scheduled at the outset of the 1978-1979

school year into three different sections of a U. S. history course. The three classes were comprised of 27, 21, and 21 students, respectively, and coincided with the 2nd, 6th, and 4th periods of the school day.

Treatments

Each of the three sections of the U. S. history course was instructed by the same teacher. The independent variable manipulated in this study was that of instructional treatment and involved three levels. Treatment I (N = 27) entailed the use of highly specific formative tests and learning correctives in the two-week unit; Treatment II (N = 21) provided students with relatively general formative tests and learning correctives; and Treatment III (N = 21) involved relatively general formative tests but excluded the use of learning correctives.

In each of the three treatments, the four formative tests were administered at the same four intermittent points in the unit; in the first two treatments, each of the four formative tests was accompanied by a set of learning correctives that was assigned as one's performance on the formative test necessitated. In those cases where feedback-corrective procedures were combined (viz., Treatments I and II), a criterion score of 100 was designated for each formative test. Any performance on a formative test that fell below the criterion resulted in the assignment of those learning correctives that corresponded to the test item(s) that had been missed.

As already alluded to, Treatments I and II represented varying degrees of specificity of feedback-corrective procedures which took the form of variations in the depth and comprehensiveness of (a) items

on the formative tests and (b) review/remedial assignments comprising the learning correctives. In the case of the test items, even though the four formative tests were comprised of 15, 10, 15, and 7 binary decision type items, respectively, the distinction between the specific and general forms of the tests was in terms of the scope of topical coverage represented by each item. For example, item #1 appearing on the first <u>specific</u> formative test read as follows:

_____1. The year 1933 was a very important one in world history. Two men came to power, one in the United States and the other in Germany. Franklin D. Roosevelt was inaugurated President of the United States on March 4, whereas Adolf Hitler had become Chancellor of Germany two months earlier.

Its counterpart on the first <u>general</u> formative test appeared as follows:

_____1. Franklin D. Roosevelt and Adolf Hitler came to power in their respective countries in the same year--1933.

With respect to the learning correctives which represented prescriptions of review/remedial work assigned on the basis of formative test items missed, once again the feature distinguishing the specific form from the general form was that of the nature and extensiveness of the corrective. Typically, a <u>specific</u> learning corrective would differ from its more <u>general</u> counterpart in that the former would involve (a) a more extensive and detailed referral of the student to the appropriate section of the advance organizer used in the unit, (b) the use of reading materials intended to supplement the basic text, and (c) the completion of a written exercise to reinforce and document the corrective work. The following

is an example of the contrast between a specific learning corrective and a general learning corrective (as based on the correctives corresponding to item #2 in the two forms of the first formative test):

Specific: Review notes corresponding to sections I,A,1,a-d,2 and I,B in the advance organizer; read pp. 716-717 (W et al, suppl.); write responses to items 2,a-c of "check-up" on p. 719 (W et al, suppl.)

General: Review notes corresponding to sections I,A,1-2 and I,B in the advance organizer; read p. 691 (VS&H, basic); Thought question: "Do you think Hitler believed in FDR's four freedoms?" Why or why not?

Instrumentation and Data Collection

Two dependent variables were examined in this study: cognitive achievement and unit evaluation. The extent of a student's achievement in the target unit was measured by a 46-item, objective-type, summative test. The content validity of this summative test was established by virtue of its criterion-referenced nature and consensus among the school's faculty in the department of social studies. The internal consistency coefficient of the test equalled .80, as adjusted by the Spearman-Brown formula. The same summative test was administered to each treatment group during the class meeting immediately following the completion of the two-week unit.

The second dependent variable--unit evaluation--was measured by a 13-item, Likert-type scale in which positive (pro) direction statements focused on various aspects of the teacher's performance, the student's performance, and the instructional/evaluative materials used. The internal consistency coefficient of the scale was .91, as adjusted by the Spearman-Brown formula. This unit evaluation scale

was administered to each treatment group subsequent to tne completion of the summative test but prior to the disclosure of grades.

Research Design and Data Analysis

This quasi-experimental study used a three-group, posttest-only design. Although a control group (in this instance one void of both formative tests and learning correctives) was not employed, the three treatment groups did allow a comparison of the impact of the presence of a combined feedback-corrective strategy as well as an increased level of specificity of feedback-corrective procedures on cognitive achievement and unit evaluation. The data resulting from the summative test and the unit evaluation scale were analyzed at the .05 level via analysis of variance; the Scheffé method was used for making multiple comparisons. Regarding the use of ANOVA on the unit evaluation data, it should be recognized that since the analysis of data from a Likert scale is usually based on summated scores (as was the case in this study), the equal-interval assumption is workable (Kerlinger, 1973; Tuckman, 1978).

Results

The analysis of variance of achievement scores indicated a significant difference among the three treatment groups, F (2, 66) = 15.76, $p < .001$ (see Table 1).

Insert Table 1 about here

Table 2 presents the results of the Scheffé method of multiple comparisons as applied to the achievement scores on the summative test for the three treatment groups. The Treatment I subjects

outperformed the Treatment II subjects, though not to a significant degree ($p < .10$); however, there was a significant difference favoring Treatment I over Treatment III ($p < .001$). Likewise, Treatment II was significantly more effective than Treatment III ($p < .025$).

Insert Table 2 about here

The analysis of variance of unit evaluation measures demonstrated a significant difference among the three treatment groups, F (2, 66) = 16.71, $p < .001$ (see Table 3).

Insert Table 3 about here

Table 4 displays the findings of the Scheffé method of multiple comparisons as applied to the unit evaluation measures on the Likert scale for the three treatment groups. The Treatment I subjects recorded significantly more favorable unit evaluations ($p < .001$) than did the subjects in Treatment II or Treatment III; however, there was no significant difference between Treatment II and Treatment III.

Insert Table 4 about here

Discussion

Regarding cognitive achievement as a dependent variable, the results of this study provide support for two of the three specific research hypotheses originally formulated:

1. The treatment group using highly specific feedback-corrective procedures will score significantly higher on an end-of-unit summative test than will the treatment group using relatively general formative tests but no learning correctives.

2. The treatment group using relatively general feedback-corrective procedures will score significantly higher on an end-of-unit summative test than will the treatment group using relatively general formative tests but no learning correctives.

The findings also support the following research hypothesis regarding cognitive achievement, though not at a significant level: the treatment group using highly specific feedback-corrective procedures will score significantly higher on an end-of-unit summative test than will the treatment group using relatively general feedback-corrective procedures.

With respect to cognitive achievement, then, this study suggests that the use of a combined feedback-corrective strategy at the unit level in social studies instruction is more efficacious than the employment of only general formative testing with no follow-up prescription of learning correctives. Furthermore, it appears that the effectiveness of the combined feedback-corrective approach is enhanced as the degree of specificity is increased.

Regarding the use of unit evaluation as a second dependent variable, this study supports two of the three specific research hypotheses formulated at the outset:

1. The treatment group using highly specific feedback-corrective procedures will record significantly more favorable unit evaluations than will the treatment group using relatively general feedback-corrective procedures.

2. The treatment group using highly specific feedback-corrective procedures will record significantly more favorable unit evaluations than will the treatment group using relatively general formative tests but no learning correctives.

With respect to the students' evaluation of the two-week unit, then, the findings of this study suggest that a mastery approach involving a combined feedback-corrective strategy of a highly specific nature is more effective than (a) a combined feedback-corrective strategy of a relatively general nature or (b) a strategy employing only general formative testing with no learning correctives.

This study serves to supplement earlier mastery learning research which focused on such mastery components as feedback instruments (Blackburn, Semb, & Hopkins, 1975; Hymel, 1974; Semb, 1975; Malott, Note 2) and unit correctives (Block & Tierney, 1974; Fiel & Okey, 1974; Hymel, 1974; Burrows & Okey, Note 3). The findings also represent an addition to an accumulating body of evidence (Block & Tierney, 1974; Crotty, 1975; Jones, 1974; Ware, 1977; Wyckoff, 1974; Jones et al., Note 1) which suggests that the effective use of a combined feedback-corrective strategy involving a manageable degree of specificity is possible within the social studies area and is not limited to only those parts of the curriculum characterized by greater structure and hierarchically-arranged content.

There is an abundance of other research possibilities regarding the use of a mastery learning strategy in social studies. For example, it would be interesting to explore the influence of different types of feedback-corrective procedures as opposed to specificity of feedback-corrective procedures on different dependent variables.

Also, the effect of using Ausubel's (1963) concept of advance organizers as a mechanism for sequencing and overviewing material in a mastery unit would be worthy of further investigation (see Rice, Note 4; Rice, Barnes, & Clawson, Note 5). Block and Burns (1976) have delineated four major types of possible mastery learning research; it is incumbent upon social studies educators to explore the mastery learning literature and the promise of this approach to curricular/instructional/evaluative practices.

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Table 1

Analysis of Variance of Achievement Scores for the Three Treatment Groups

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Squares	F
Between groups	2	6496.40	3248.20	15.76*
Within groups	66	13606.24	206.16	
Total	68	20102.64		

*Significant at the .001 level.

Table 2

Scheffé Method of Multiple Comparisons As Applied to Achievement Scores for the Three Treatment Groups

Contrast	Estimate of Contrast	Estimate of Variance of Contrast	Estimate of Standard Deviation of Contrast	Ratio of Estimate of Contrast to Estimate of Standard Deviation of Contrast
$u_1 - u_2$	10.02	16.49	4.06	2.47
$u_1 - u_3$	23.45	16.49	4.06	5.78*
$u_2 - u_3$	13.43	18.55	4.31	3.12**

*Significant at the .001 level.

**Significant at the .025 level.

Table 3

Analysis of Variance of Unit Evaluation Measures for the Three Treatment Groups

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Squares	F
Between groups	2	1382.01	691.01	16.71*
Within groups	64	2646.98	41.36	
Total	66	4028.99		

*Significant at the .001 level.

Table 4

Scheffé Method of Multiple Comparisons As Applied to

Unit Evaluation Measures for the Three Treatment Groups

Contrast	Estimate of Contrast	Estimate of Variance of Contrast	Estimate of Standard Deviation of Contrast	Ratio of Estimate of Contrast to Estimate of Standard Deviation of Contrast
$u_1 - u_2$	10.54	3.72	1.93	5.46*
$u_1 - u_3$	7.63	3.72	1.93	3.95*
$u_2 - u_3$	-2.91	3.72	1.93	-1.51

*Significant at the .001 level.